



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/668,914	09/23/2003	Nishant Sinha	2269-5859US (02-0390.00/U)	2525
24247	7590	05/20/2005	EXAMINER	
TRASK BRITT P.O. BOX 2550 SALT LAKE CITY, UT 84110			LINDSAY JR, WALTER LEE	
			ART UNIT	PAPER NUMBER
			2812	

DATE MAILED: 05/20/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

EF

Office Action Summary	Application No. 10/668,914	Applicant(s) SINHA, NISHANT	
	Examiner Walter L. Lindsay, Jr.	Art Unit 2812	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-72 is/are pending in the application.
- 4a) Of the above claim(s) 1-24, 33-63 and 67-72 is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 25-32 and 64-66 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|--|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>4/18/2005</u> | 6) <input type="checkbox"/> Other: ____ |

Art Unit: 2812

DETAILED ACTION

This Office Action is in response to an Election filed on 2/22/2005.

Currently, claims 1-72 are pending. Claims 1-24, 33-63 and 67-72 have been withdrawn from consideration.

Election/Restrictions

1. Applicant's election without traverse of claims 25-32 and 64-66 in the reply filed on 2/22/2005 is acknowledged.
2. Claims 1-24, 33-63 and 67-72 have been withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected devices and methods, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on 2/22/2005.

Specification

3. The specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Art Unit: 2812

5. Claims 25-29, 31 and 32 are rejected under 35 U.S.C. 102(e) as being anticipated by Halahan et al. (U.S. Patent No. 6,498,381, filed 2/22/2001).

Halahan shows the structure as claimed in Figs. 1-5 and in the corresponding text as: a substrate (110) having a first surface and an opposing, second surface (col. 2, line 65-col. 3, line 8); and at least one via (130) extending into the first surface of the substrate and terminating short of the opposing, second surface (col. 3, lines 9-28); wherein the at least one via comprises an annular conductive layer (320) that extends from the first surface and circumscribes a filler material (340) (col. 3, lines 45-51) (claim 25). Halahan teaches that the annular conductive layer comprises a metal formed on a seed layer (310), wherein the seed layer is located between the metal layer and the substrate (the metal layer is formed on top of the seed layer)(col. 3, lines 36-44) (claim 26). Halahan teaches that the filler material is selected from the group consisting of spin-on-glass, polysilicon, solder paste and solder alloy (silicon dioxide or like materials)(col. 4, lines 41-55) (claim 27). Halahan teaches that the filler material is either a conductive or a nonconductive filler material (col. 3, lines 45-51) (claim 28). Halahan teaches that the seed layer is selected from the group consisting of titanium nitride, titanium, tantalum nitride, copper, silicon nitride, and polysilicon (col. 4, lines 41-55) (claim 29). Halahan teaches that an insulative layer (310) is located between the annular conductive layer and the substrate (col. 3, lines 39-44) (claim 31). Halahan teaches that a barrier layer (120) is formed on the first surface (col. 2, line 65-col. 3, line 8) (claim 32).

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

8. Claim 30 is rejected under 35 U.S.C. 103(a) as being unpatentable over Halahan et al. (U.S. Patent No. 6,498,381, filed 2/22/2001) in view of Bhatt et al (U.S. Patent No. 6,418,616, filed 2/28/2001).

Halahan shows the structure substantially as claimed and as described in the preceding paragraph.

Halahan lacks anticipation only in not explicitly teaching that: 1) the metal layer is selected from the group of metals consisting of metals consisting of nickel, cobalt, copper, silver, titanium, iridium, gold, tungsten, tantalum, molybdenum, platinum, palladium, nickel-phosphorus, palladium-phosphorus, cobalt-phosphorous, a Co-W-P alloy, alloys of the foregoing metals and mixtures of any of the foregoing (claim 30).

Art Unit: 2812

Bhatt show a process of filling a through hole and filling it. In Fig. 1 substrate (10) undergoes plating initiation via deposition of a seed layer (col. 4, lines 17-41). In Fig. 2 a layer of electrically conductive metal (14) preferably copper is deposited on the surfaces in the through hole (col. 4, lines 17-41). This process aids in overcome the problem overetching of metals during subtractive etch method of circuitization.

It would have been obvious to one of ordinary skill in the art, at the time the invention was made, to modify the structure of Halahan by choosing a metal from the group consisting of nickel, cobalt, copper, silver, titanium, iridium, gold, tungsten, tantalum, molybdenum, platinum, palladium, nickel-phosphorus, palladium-phosphorus, cobalt-phosphorous, a Co-W-P alloy, alloys of the foregoing metals and mixtures of any of the foregoing, as taught by Bhatt, with the motivation that Bhatt teaches a process that aids in overcome the problem overetching of metals during subtractive etch method of circuitization.

9. Claims 64-66 are rejected under 35 U.S.C. 103(a) as being unpatentable over Halahan et al. (U.S. Patent No. 6,498,381, filed 2/22/2001) in view of Farnworth et al (U.S. Patent No. 6,620,731, filed 1/4/2002).

Halahan shows the structure substantially as claimed and as described in the preceding paragraph.

Additionally, Halahan teaches: 1) a substrate having a first surface and an opposing, second surface (col. 2, line 65-col. 3, line 8); and at least one via extending into the first surface of the substrate and terminating short of the opposing, second surface (col. 3, lines 9-28) (claim 64); 2) an insulative layer located between the

Art Unit: 2812

conductive filler material and the substrate (col. 3, lines 40-51)(claim 65); and 3) a barrier layer on the first surface, col. 2, line 65-col. 3, line 8) (claim 66).

Halahan lacks anticipation only in not explicitly teaching that: 1) wherein the at least one via includes conductive filler material comprising a solder alloy that extends from the first surface (claim 64).

Farnworth shows a method for forming semiconductor components and interconnects with contacts on opposing sides. Farnworth shows a via (30) being formed in substrate (10) (col. 6, lines 39-46). Via (30) is then coated with an insulating layer 32. A solder metal is then screen printed in the vias (30) and drawn into the via(30) with capillary action (col. 6 lines 47-61). This process is employed to provide improved electronic assemblies and test systems in order to improve electrical communication (col. 12, lines 6-11).

It would have been obvious to one of ordinary skill in the art, at the time the invention was made, to modify the structure of Halahan, by filling the via with a solder alloy that extends from the first surface, as taught by Farnworth, with the motivation that Farnworth teaches a process for improving electronic assemblies and test systems in order to improve electrical communication.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Walter L. Lindsay, Jr. whose telephone number is (571) 272-1674. The examiner can normally be reached on Monday-Thursday.

Art Unit: 2812

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael S. Lebentritt can be reached on (571) 272-1873. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Walter L. Lindsay, Jr.
Examiner
Art Unit 2812

WLL
May 11, 2005

